autosomal recessive spastic ataxia of Charlevoix-Saguenay

Autosomal recessive spastic ataxia of Charlevoix-Saguenay, more commonly known as ARSACS, is a condition affecting muscle movement. People with ARSACS typically have abnormal tensing of the muscles (spasticity), difficulty coordinating movements (ataxia), muscle wasting (amyotrophy), involuntary eye movements (nystagmus), and speech difficulties (dysarthria). Other problems may include deformities of the fingers and feet, reduced sensation and weakness in the arms and legs (peripheral neuropathy), yellow streaks of fatty tissue in the light-sensitive tissue at the back of the eye (hypermyelination of the retina), and less commonly, leaks in one of the valves that control blood flow through the heart (mitral valve prolapse). An unsteady gait is the first symptom of ARSACS. It usually appears between the age of 12 months and 18 months, as toddlers are learning to walk. The signs and symptoms worsen over the years, with increased spasticity and ataxia of the arms and legs. In some cases spasticity disappears, but this apparent improvement is thought to be due to degeneration of nerves in the arms and legs. Most affected individuals require a wheelchair by the time they are in their thirties or forties.

This condition was first seen in people of the Charlevoix-Saguenay region of Quebec, Canada. The majority of people with ARSACS live in Quebec or have recent ancestors from Quebec. People with ARSACS have also been identified in Japan, Turkey, Tunisia, Spain, Italy, and Belgium. The signs and symptoms of ARSACS seen in other countries differ from those in Quebec. In people with ARSACS outside of Quebec, hypermyelination of the retina is seen less often, intelligence may be below normal, and symptoms tend to appear at a later age.

Frequency

The incidence of ARSACS in the Charlevoix-Saguenay region of Quebec is estimated to be 1 in 1,500 to 2,000 individuals. Outside of Quebec, ARSACS is rare, but the incidence is unknown.

Genetic Changes

Mutations in the *SACS* gene cause ARSACS. The *SACS* gene provides instructions for producing a protein called sacsin. Sacsin is found in the brain, skin cells, muscles used for movement (skeletal muscles), and at low levels in the pancreas, but the specific function of the protein is unknown. Research suggests that sacsin might play a role in folding newly produced proteins into the proper 3-dimensional shape because it shares similar regions with other proteins that perform this function. Mutations in the *SACS* gene cause the production of an unstable sacsin protein that does not function

normally. It is unclear how the abnormal sacsin protein affects the brain and skeletal muscles and results in the signs and symptoms of ARSACS.

Inheritance Pattern

This condition is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

Other Names for This Condition

- ARSACS
- Charlevoix-Saguenay spastic ataxia
- spastic ataxia of Charlevoix-Saguenay
- spastic ataxia, Charlevoix-Saguenay type

Diagnosis & Management

These resources address the diagnosis or management of ARSACS:

- GeneReview: ARSACS
  https://www.ncbi.nlm.nih.gov/books/NBK1255
- Genetic Testing Registry: Spastic ataxia Charlevoix-Saguenay type
  https://www.ncbi.nlm.nih.gov/gtr/conditions/C1849140/

These resources from MedlinePlus offer information about the diagnosis and management of various health conditions:

- Diagnostic Tests
  https://medlineplus.gov/diagnostictests.html
- Drug Therapy
  https://medlineplus.gov/drugtherapy.html
- Surgery and Rehabilitation
  https://medlineplus.gov/surgeryandrehabilitation.html
- Genetic Counseling
  https://medlineplus.gov/geneticcounseling.html
- Palliative Care
  https://medlineplus.gov/palliativecare.html

Additional Information & Resources

MedlinePlus

- Health Topic: Degenerative Nerve Diseases
  https://medlineplus.gov/degenerativenervediseases.html
- Health Topic: Movement Disorders
  https://medlineplus.gov/movementdisorders.html
- Health Topic: Neurologic Diseases
  https://medlineplus.gov/neurologicdiseases.html

Genetic and Rare Diseases Information Center

- Spastic ataxia Charlevoix-Saguenay type
  https://rarediseases.info.nih.gov/diseases/4910/spastic-ataxia-charlevoix-saguenay-type

Educational Resources

- Disease InfoSearch: Spastic ataxia Charlevoix-Saguenay type
  http://www.diseaseinfosearch.org/Spastic+ataxia+Charlevoix-Saguenay+type/6671
- Kennedy Krieger Institute: Movement Disorders
  https://www.kennedykrieger.org/patient-care/diagnoses-disorders/movement-disorders
- MalaCards: spastic ataxia, charlevoix-saguenay type
  http://www.malacards.org/card/spastic_ataxia_charlevoix_saguenay_type
- Merck Manual Home Edition for Patients and Caregivers: Coordination Disorders
  http://www.merckmanuals.com/home/brain-spinal-cord-and-nerve-disorders/movement-disorders/coordination-disorders
- University of Minnesota Ataxia Center
  http://www.ataxiacenter.umn.edu/aboutataxia/home.html

Patient Support and Advocacy Resources

- Ataxia of Charlevoix-Saguenay Foundation
  http://arsacs.com/
- Muscular Dystrophy Association
  https://www.mda.org/
- Muscular Dystrophy Canada
  http://www.muscle.ca/index.php?id=23
- National Ataxia Foundation
  http://www.ataxia.org/

GeneReviews

- ARSACS
  https://www.ncbi.nlm.nih.gov/books/NBK1255

Genetic Testing Registry

- Spastic ataxia Charlevoix-Saguenay type
  https://www.ncbi.nlm.nih.gov/gtr/conditions/C1849140/

ClinicalTrials.gov

- ClinicalTrials.gov
  https://clinicaltrials.gov/ct2/results?cond=%22autosomal+recessive+spastic+ataxia+of+Charlevoix-Saguenay%22

Scientific Articles on PubMed

- PubMed
  https://www.ncbi.nlm.nih.gov/pubmed?term=%28ARSACS%5BTIAB%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3240+days%22%5Bdp%5D

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